

Academic Degrees

1988 B.Sc. Physics, Mathematics and Computer Science, Hebrew University.
1991 M.Sc. Physics, Technion.
1996 Ph.D. Physics, Technion.

Academic Appointments

2018 – Professor, Dept. of Chemical Engineering, Technion.
2008 – 2018 Assoc. Professor, Dept. of Chemical Engineering, Technion.
2001 – 2008 Senior Lecturer, Dept. of Chemical Engineering, Technion.
1996 – 1999 Post-Doctoral Scientist, NEC Research Institute, Princeton.

Professional Experience

1999-2001 R&D physicist, Insightec Inc., Haifa.

Research Interests

Learning and control, adaptation and homeostasis in biological systems. Phenotypic variability and dynamics in cell populations. Neural and synaptic dynamics in networks. Interaction and synchronization among cells and other complex systems.

Technion Activities

2022 – 2025 Executive Vice President for Academic Affairs
2021 – 2022 Member of the Senate Standing Committee for appointment & promotion

Public Professional Activities

2020- Physical Review Letters, Division Associate Editor
2020-2022 Chair of Scientific Committee, Azrieli Fellowship

Recent Graduate Students

MSc: A. Stawsky (2021); R. Fachareldeen (2026); J. Lin (2027); K. Kushinsky (2028); M. Ben-Eliezer (2028); J. Wu (2028).

PhD: Lee Susman (2020); Aseel Shomar (2023)

Recent Post-Doctoral and Research Fellows

K. Biswas (2022-2024); N. Ofek (2023-2028); R. Teichner (2023-); S. Rybnikov (2026-).

Recent Research Grants

2021-2025 DIP, EU 1,635,000. With S. Rumpel, N. Brose, C. Dean, M. Kaschube and N. Ziv.

2025-2029 BSF, \$ 325,000. PIs: Naama Brenner, H. Salman (U Pittsburgh).

Recent Selected Publications

<https://scholar.google.com/citations?user=6ksPmnIAAAAJ&hl=en&oi=ao>

- L. Geyrhofer, P. Ruelens, A.D. Farr, D. Pesce, A.G.M. de Visser, N. Brenner. "Race to survival during antibiotic breakdown". *mBio* **14** (2), e02456 (2023)
- R. Teichner, A. Shomar, O. Barak, N. Brenner, S. Marom, R. Meir, D. Eytan. "Identifying Regulation with Adversarial Surrogates". *PNAS* **120**, (2023)
- K. Biswas and N. Brenner. "Universality of phenotypic distributions in bacteria." *Physical Review Research* **6** L022043 (2024)

- L. Albantakis, C. Bernard, N. Brenner, E. Marder, R. Narayanan. "The brain's best kept secret is its degenerate structure." *J. Neuroscience* **44**.40 (2024)
- R. Teichner, N. Brenner, R. Meir. "Identifying dynamic regulation with machine learning using adversarial surrogates". *PLoS One* **20** (6), e0325443 (2025)
- R. Teichner, R. Meir, N. Brenner, "Autonomous Discovery of Physical Laws via Adversarial Surrogates: Rediscovering Kepler's Laws from Observational Data". *ICoIAS*, Osaka, Japan, 139-145 (2025)
- K. Biswas, H. Salman, N. Brenner. "Emergent homeostasis and degeneracy from multi-dimensional attractors". *Bioessays* **3**, e70116, (2026)
- R. Fachareldien, N. Brenner. "Evolution on degenerate fitness landscapes is not random: curvature drives directional drift". *PNAS* **123**, e2605142123, (2026)

Patents

- "Systems and methods for reducing secondary hot spots in a phased array focused ultrasound system". Vitek and Brenner (2002)
US patent # 6,419,648.
- "Systems and methods for controlling distribution of acoustic energy around a focal point with a focused ultrasound system". Vitek and Brenner (2003)
US patent # 6,506,171.
- "Methods and apparatus for controlling thermal dosing in thermal treatment systems". Freundlich, Vortman, Yagel, Vitek and Brenner (2003).
US patent # 6,618,620.

Recent Selected International Conference Invitations

- GRC on Stochastic Physics in Biology, Ventura, CA. Oct 2021.
- From single cells to landscapes, Alleppey, Kerala, India, Nov 2022.
- GRC on Stochastic Physics in Biology, Ventura, CA, Oct 2023
- Les Houches Summer School on Theoretical Biophysics, Les Houches, July 2023.
- FENS Forum, Vienna, June 2024.
- Society for Neuroscience Annual meeting, Chicago, Oct 2024.
- From Soft Matter to Biophysics, Les Houches workshop Feb. 2025.
- Quantitative Microbial Physiology and Ecology Conference, Shenzhen May 2025
- Workshop on Extremal Statistics in Biology, Erwin Schrödinger International Institute for Mathematics and Physics (ESI), Vienna, June 2025
- Konstanz Summer School on Collective Behavior, Konstanz, July 2025
- Logic of Life symposium, Zurich, October 2025.
- Lorentz Workshop on Cell Evolution, October 2026, Leiden.
- Mathematical and Physical Approaches in Microbial Systems. Isaac Newton Institute for Mathematical Sciences, Cambridge, UK. August 2027.
- Inverse Problems in Biological Systems: From Data to Mechanism. (BIRS), Banff, Canada, September 2027

Recent International Conference Organization

- Workshop on Unifying Principles of Learning With and Without Brains. Dresden, July 2025 (with Karen Alim, Omri Barak, Jen Schwarz).
- Brainless26: Biological Learning without a Brain, KITP program June-July 2026 (with Karen Alim, Arvind Murugan, Jen Schwarz).